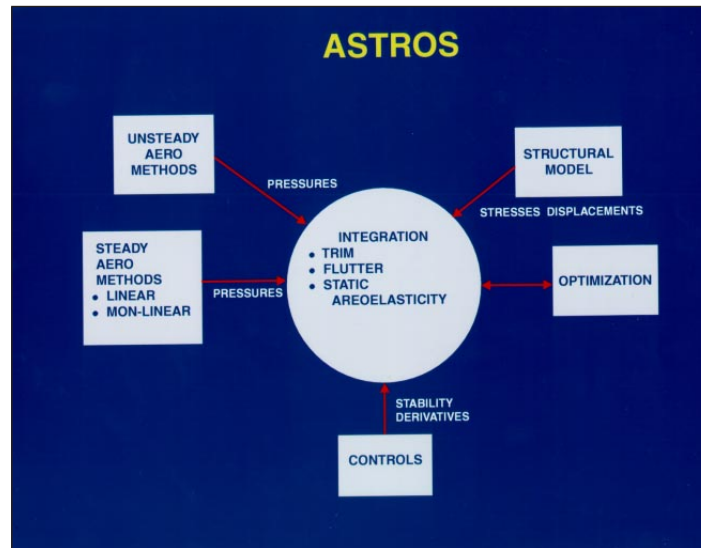




COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENT (CRADA) IS TECHNOLOGY TRANSFER MECHANISM FOR AUTOMATED STRUCTURAL OPTIMIZATION SYSTEM (ASTROS)

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Payoff

The CRADA with Universal Analytics Incorporated for continued enhancement and commercialization of a multidisciplinary design method called ASTROS has allowed rapid technology transfer to industry, national laboratories and universities at no cost to the Government. This cooperative approach will save the Air Force an estimated \$500,000 - \$750,000 per year.

Accomplishment

Under a Cooperative Research and Development Agreement between the Air Vehicles Directorate's Structures Division and Universal Analytics Incorporated (UAI) of Los Angeles, the multidisciplinary design optimization program called ASTROS was updated and commercialized as one of the primary structural design tools in the private sector. This program integrates structures, aerodynamics, aeroelasticity, controls and optimization to facilitate interdisciplinary design of aerospace structures.

Background

The goal of ASTROS is to implement mathematical optimization algorithms along with engineering analyses to produce a practical design tool for engineers to meet current and future performance requirements with payoffs in reduced airframe weight and/or design cost. ASTROS was developed by a consortium of Northrop, UAI and the Air Vehicles Directorate. The updated version of ASTROS will enable the designer to define multidisciplinary objective functions and constraints. That is, ASTROS can now be used to minimize or maximize a user defined function that includes parameters from structural design (e.g. weight, stress, displacement, modes, shapes and frequencies), aeroelasticity (e.g. unsteady aeroelastic response, lift and roll) and flight controls (e.g. control surface effectiveness, control power requirements and control surface deflection schedules). This capability enables the aircraft designer to simultaneously design the structure, controls and aerodynamic performance, and is enabling for optimization of Active Aeroelastic Wing design and Maneuver Load Control technologies. ASTROS is widely applicable within and outside the aerospace structures community and is currently being used by over 100 organizations including the aerospace and automotive industries, mechanical and civil engineering industries, universities, Navy and NASA.